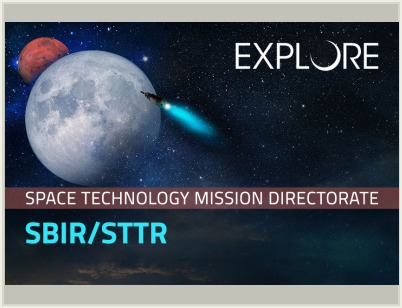
ASPECT (Automated System-level Performance Evaluation and Characterization Tool), Phase II

Completed Technology Project (2015 - 2017)

Project Introduction

SSCI has developed a suite of SAA tools and an analysis capability referred to as ASPECT (Automated System-level Performance Evaluation and Characterization Tool). ASPECT encapsulates our airspace encounter generator, sensor/tracker fusion algorithms, and prediction, threat assessment, and avoidance modules. It also provides both component-level and system-level analysis that is required for evaluating how well SAA sensors and software meet fundamental safety requirements for UAS in the NAS. ASPECT consists of MESSENGER (Multi-aircraft Encounter Scenario Generator), ASSIST (AsynchronouS Sensor fusIon SysTem), FORECAST (Fast On-line Prediction of Aircraft State Trajectories), and REACT (Rapid Encounter Avoidance & Conflict Resolution) modules. Initial versions of FORECAST and REACT were designed under related projects. Phase I developed the ASSIST (Asynchronous Sensor Fusion System) capability, which fuses combinations of SAA sensors such as GRB, ABR, camera, and Mode C transponder for localizing non-communicating threats. ASPECT was then used to analyze ASSIST's estimation accuracy, with the objective of achieving the precision of ADS-B and rejecting spurious/clutter tracks. Phase II will: (i) Expand and validate the underlying sensor models and demonstrate capability using flight test data generated at Olin College (Needham, MA), (ii) Extend our REACT system, and (iii) Carry out SAA system-level analyses using ASPECT to illustrate the relationship between sensor suite (hardware) selection, component SAA software modules, and achievable safety performance of the integrated system. The result of Phase II efforts will be a complete flow-down error and risk analysis framework, which constitutes a major step toward the integration of UAS into the National Airspace System. Phase II plans have been reviewed by NASA's UAS Traffic Management Program and AeroVironment (letters of support attached), who we anticipate to be one of our early transition partners.



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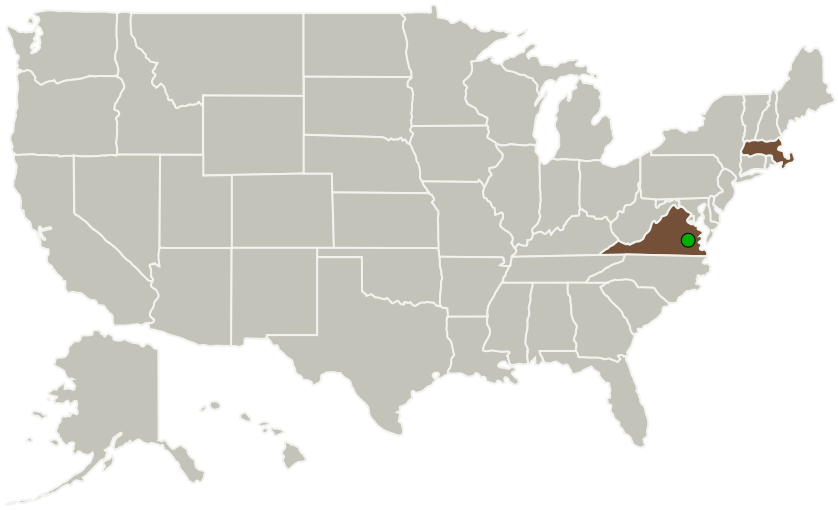
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Scientific Systems Company, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Woburn, Massachusetts
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Massachusetts	Virginia

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Scientific Systems Company, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

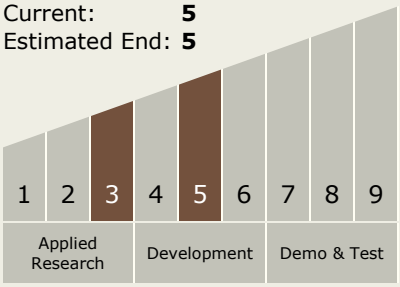
Carlos Torrez

Principal Investigator:

Joseph Jackson

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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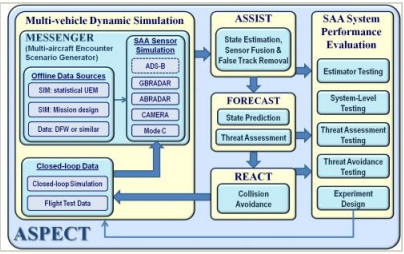
Images



Briefing Chart
ASPECT (Automated System-level Performance Evaluation and Characterization Tool) Briefing Chart
(https://techport.nasa.gov/image/126537)

Technology Areas

Primary:

- TX16 Air Traffic Management and Range Tracking Systems
  - TX16.4 Architectures and Infrastructure

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System